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VA developed software aids A-10 maintenance

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WRIGHT-PATTERSON AIR FORCE BASE, Ohio — The Air Force Research Laboratory has developed software that was used by the Ogden Air Logistics Center (OO-ALC) to design the first ever A-10 boron patch. The Composite Repair of Aircraft Structures (CRAS) program provides a design and analysis tool for bonded repairs that decreases maintenance and support costs while increasing aircraft availability.

The Air Vehicles Directorate coordinated with Boeing to develop the software. CRAS provides technology improvements for bonded repair design and analysis of bonded repairs to a damaged metallic structure. This technology was transitioned to OO-ALC, who used it to design a patch for an A-10 wing segment.

In the past, cracks in aging aircraft structures were repaired with mechanically fastened repairs to restore static strength and restrict damage growth. These repairs were easily installed, but they had significant drawbacks including weight addition, parent material removal, and stress riser introduction.

Bonded repairs are lightweight, thin, corrosion resistant, and conform to the original structure. Gluing a composite patch to the structure eliminates the need to drill holes for fasteners. Also, the composite patch does not interfere with non-destructive inspection of the underlying damaged structure.

CRAS is a Microsoft Windows application. It creates and studies designs for bonded composite repairs to metallic structure with cracks and corrosion grind-out areas. It also uses a finite element model generator to study repairs for holes, holes with grind-outs, dents, and cutouts.

In the first practical application of the CRAS software, OO-ALC scientists designed a patch used to repair a corrosion grind-out on the A-10's upper wing surface. The CRAS software is also being used to fix a crack in the A-10 wing station 90. Use of these patches will decrease fleet wide A-10 depot time, resulting in decreased maintenance costs and increased aircraft availability for the warfighter. @